ABSTRACT:

Purpose – The purpose of this paper is to propose an on-line algorithm to calculate the switching angles of the harmonics elimination pulse-width modulation (HEPWM) scheme that can be suitably implemented using a simple microprocessor/microcontroller. It is to be used for three-phase voltage source inverter (VSI).

Design/methodology/approach – Approximate equations for the HEPWM angles are obtained by performing quadratic curve fittings of the trajectories of the exact HEPWM angles. This paper aims to obtain approximate equation that can be programmed on-line using microprocessor/microcontroller.

Findings – The main feature of the algorithm is simplicity, whereby only addition and multiplications functions are required. It shall be shown that the proposed scheme allows for an efficient real-time computation with acceptable error margins. The workability of the algorithm is validated with hardware results.

Practical implications – Since the algorithm allows for on-line changes of the number of harmonics to be eliminated and an independent control of the fundamental component of the VSI, it is very suitable for motor drive applications.

Originality/value – Owing to the transcendental nature of the HEPWM equations, the exact solution for the switching angles requires vast computing power. The quadratic curve fitting method proposed in this paper simplifies the angle calculations to only multiplication and addition functions. It can be easily implemented using a simple microprocessor/microcontroller.